

WHAT MAKES A MOOC?

MASSIVE OPEN ONLINE COURSES (MOOCs) COMPARED TO MAINSTREAM ONLINE UNIVERSITY COURSES

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ABSTRACT

A Massive Open Online Course (MOOC) is a model for delivering learning content online to any person who wants to take a course, with no limit on attendance. The MOOC industry is growing rapidly, fueled by students interested in free higher-education learning, and the universities and venture capitalists willing to fund the courses. This paper compares the MOOC format with the format of a Mainstream Online University Course (MOUC). Comparing MOOCs with MOUCs will help those readers familiar with online courses to understand the unique characteristics of MOOCs, and their implications for learning. MOOCs are compared to MOUCs on the following dimensions: Course enrollment; Openness; Price; Content media; Discussion forums; Assessment; and Instructor contact. MOOCs are already effective substitutes for learning that is not for academic credit. Several experiments are under way that may result in MOOCs contributing to for-credit courses or delivering them entirely.

INTRODUCTION

A Massive Open Online Course (MOOC) is a model for delivering learning content online to any person who wants to take a course, with no limit on attendance (Educause, 2013). The MOOC format is evolving and growing rapidly. The MOOC industry is dominated by three MOOC content platforms; Coursera, edX, and Udacity, and is characterized by a growing number of sponsoring universities, instructors and courses (Pappano, 2012).

This paper focuses on Coursera, founded in 2012 by two Stanford University professors. By early 2013 Coursera presented 313 courses from 62 institutions, including 16 international institutions (Empson, 2013). Coursera announced its 3 millionth user on March 13, 2013 (Coursera, 2013a).

According to Coursera (2013b): “We are a social entrepreneurship company that partners with the top universities in the world to offer courses online for anyone to take, for free. We envision a future where the top universities are educating not only thousands of students, but millions. Our technology enables the best professors to teach tens or hundreds of thousands of students.” Coursera is an online platform with which students can participate in online courses by faculty from select universities.

This paper compares the MOOC format with the format of a Mainstream Online University Course (MOUC),

a term invented for this paper. Comparing MOOCs with MOUCs will help those readers familiar with online courses to understand the unique characteristics of MOOCs, and their implications for learning.

A Mainstream Online University Course (MOUC) is presented online, by an accredited university, and for academic credit. (Accredited means by a US Department of Education recognized accreditation body.) By “mainstream” we mean the online version of what the bulk of higher education, leading to academic degrees, looks like.

The author has completed five MOOCs on business (U of Pennsylvania; U of California-Irvine), history and physics (U of Virginia), and science (Duke) via Coursera. The author has also taught numerous Mainstream Online University Courses at multiple universities, as well as face-to-face courses, as a university professor (over 6000 students in over 280 courses).

MOOCS VERSUS MOUCS

There is a wide variety of Mainstream Online Courses as well as a growing variety of MOOCs. This paper will focus on the modal defining characteristics of each format. Table 1 summarizes the contrasting characteristics of the two formats.

TABLE 1 COMPARISON OF MASSIVE OPEN ONLINE COURSES (MOOCs) WITH MAINSTREAM ONLINE UNIVERSITY COURSES (MOUCs)		
	Massive Online Open Course (Coursera)	Mainstream Online University Course
Course enrollment	Thousands	Tens (to hundreds)
Openness	Required: Email address	Required: University enrollment (selective admission); course enrollment (on space-available basis).
Price	Price: Free (Freemium)	Price: thousands \$
Content media	Video	Textbook
Discussion forums	Optional	Required and evaluated
Assessment	Machine-scored; peer	Instructor; machine-scored
Instructor contact	None expected	24 hour response

Course enrollment

“Massive” student enrollments are a defining characteristic of MOOCs. Enrollment in a single course can be over a hundred thousand students. MOOCs are designed to operate at scale, and the design elements that enable massive enrollments will be discussed. “Enrollment” is a fuzzy term for MOOCs because students are not counted as in Mainstream Online University Courses, based on add-dates, drop-dates, and tuition payment dates.

MOOC enrollment metrics include course enrollment, videos viewed, and assessments completed (at various points in the course). For example, below are approximate “enrollment” and grade data from Dr. Mohamed Noor’s (Duke) Introduction to Genetics and Evolution course, ended in April 2013.

- ▶ Student Enrollment (Johnsen, 2013)
 - 23,908 students enrolled in the class.
 - 15,500+ unique students watched at least one video.
 - 9,100+ unique students attempted the homework sets a total of 48,000+ times
 - 2,000 unique students posted the discussion forums.
 - 1831 people took both the midterm and final exam.*
- Grade distribution (Noor, 2013)
 - 73% of the people “enrolled” had a grade of 0.
 - 799 received a course score of 80 or higher.*
 - 1457 received a course score of 60 or higher.*

- 3 people received a perfect 100% score on the entire course.
- *additional students completed a Credit Recommendation Exam in lieu of the exams.

As another example, about 81,600 people enrolled in Kevin Werbach’s (Wharton) Gamification course that ended in October 2012, and about 10,600 submitted the final exam (Werbach, 2012).

Mainstream Online University Courses have significantly lower course enrollments. The University of Phoenix has the largest total online enrollment with about 301,800 students (Harlin, 2013), with an average class size of 8 to 26 students per class (University of Phoenix, n.d.).

The University of Maryland University College is another large mainstream online course provider, with almost 263,000 online course enrollments in 2012 (UMUC, n.d.), and class sizes which average between 25-35 students (UMUC, n.d.b). Next we discuss the “openness” and “price” factors which, along with technology, enable MOOCs to operate at much larger scale than MOUCs.

Openness

A student who enrolls in a university typically submits an application far in advance, then must survive a (sometimes selective) admissions process, then may enroll in a course on a space-available basis, providing course pre-requisites are met.

Coursera requires only an email address for a student to enroll in a course. Compared to enrolling in a Mainstream Online University Course, enrolling in a MOOC is comically simple. The “open” in MOOC means an enrollment process with as few hurdles as possible for students, in-

cluding no scarcity of access, no application red-tape, no pre-requisites, and no (low) cost, which is discussed next.

Price

In the spirit of openness, the typical price to a student to enroll and complete a MOOC is free. The only requirements are for the student to register with an email address and password, and complete the course requirements. This is compared to a price of thousands of dollars to enroll in a MOUC.

The University of Phoenix, a private, for-profit university mentioned previously having the largest online enrollment, charges tuition of \$585 per undergraduate credit hour, plus any fees (University of Phoenix, n.d.b). UMUC, a public non-profit university with a large online enrollment, charges tuition of \$499 per undergraduate credit hour for nonresidents of Maryland (UMUC, n.d.c). The average annual tuition and fees at a public 4-year institution in 2012 was \$8655 per year, or about \$288 per credit hour based on 30 credit hours per year (The College Board, 2012).

The price of “free” for MOOCs should be noted with an asterisk, however, because the pricing is moving to a “freemium” model, where the basic course is free and students can pay for optional “extras.”

For example, The Introduction to Genetics and Evolution course from Duke which ended in April 2013, mentioned earlier, was offered with the options listed below. See an example of a certificate that was identity-verified and earned via a Credit Recommendation exam at <http://tinyurl.com/boj9wjt>.

- ▶ Price: The Introduction to Genetics and Evolution
 - Price to enroll and possibly earn a certificate: free
 - Price for the opportunity to earn a verified certificate: \$49.
 - Price to take a proctored, online examination and possibly earn academic credit: \$69
 - Price to transfer credit to a university: \$40
 - Total price with options: \$158.

Although not free, the freemium offering by Coursera and Duke was still a good value. A student could freely enroll in the Introduction to Genetics and Evolution course, taught by a highly-qualified professor (Muhamed Noor). By paying for the options a student could possibly earn two hours of lower-division semester credit for “introduction to biology or general science.”

Dr. Noor and Duke developed and managed the course, Coursera delivered it and verified the student identities, ProctorU proctored the online examination, the American Council on Education (ACE) recorded the credit for the (ACE-certified) exam, and ACE holds the record for transfer to accepting universities.

Approximately 2000 institutions accept ACE-credit, for courses that may include the five Coursera courses (currently) certified by ACE for college credit. Other institutions are moving to accept MOOCs for academic credit directly. Antioch University contracted with Coursera to offer “course in a box” versions of MOOCs, developed by other universities, for credit as part of a bachelor’s degree program (Kolowich, 2012).

Udacity, another MOOC provider, announced a pilot program to offer remedial and introductory math courses to students from San Jose State University at a student cost for each three-unit course of \$150, significantly less than regular San Jose State tuition (Lewin & Markoff, 2013). It should be noted that most universities which have developed MOOCs do not themselves recognize them for credit purposes, with the exception of University of Washington (Thomas, 2012).

These data are presented to compare the price of a credit-bearing MOOC with a MOUC, which typically offers, and is taken for, academic credit. The freemium model does not diminish from the value of the free basic course to students who do not seek credit; the free course gives unfettered access for students to obtain instruction from elite universities.

Content media

The use of video to present course content is another key difference between MOOCs and MOUCs. There are of course exceptions to this distinction, but the modal format of MOOCs is video presentation, and the modal presentation format of MOUCs is text.

The typical MOOC presentation at Coursera is a video of the professor, overlaid or interspersed with presentation slides. The setting is the professor sitting “across the table” and having somewhat informal conversation with the viewer. Other features of the video may include other audio and video clips, written notations by the instructor, and periodic “interactive” multiple choice questions for the student to answer.

Although no textbook is required, the framework of the MOOCs is based on a book, textbook, or other defined domain of knowledge. MOOCs often recommend chapter readings from a textbook, but make a point of designing the course to be completed without a student obtaining a textbook, another nod to the value of openness. The

typical MOUC presentation relies on text, primarily via a textbook or with individual readings.

Discussion forums

MOOCs typically have active discussion forums that are optional for students. Students can post questions to, or answer the questions of, their peers. Forums are typically monitored by one or more teaching assistants, but there is generally no expectation that the professor will participate. The forums are typically independent of required course activities.

MOUCs also typically have discussion forums. Often students are required to participate in select forum discussions or in the discussions in general, and their posts are counted and/or evaluated as part of participation grade. Instructors are expected to be active and available in the discussion forums, and to respond to specific student questions within 24 hours, typically.

Assessment

The majority of assessment in MOOCs is based on fully machine-scored multiple-choice questions. Options such as: quiz score revealed immediately or later; quiz attempt timed or not; quizzes accepted late; multiple quiz attempts; etc. are set at the preference of the professor. Short answer or fill-in-the-word questions are generally not used. Overall the assessment format is generous by university standards: assessments are often without time constraints, with access to notes, and with the ability to review course videos and other material such as presentation slides.

MOOCs often use peer assessments. To obtain credit for an "essay" type assessment, students must evaluate the essays of five peers, as well as evaluate his or her essay. Students use a grading rubric to evaluate the essays. By getting six data points based on a rubric, the professor can presumably get an evaluation that approaches the validity of that provided by graders or even a quick graduate-student read.

Two criticisms of peer evaluations in MOOCs are (1) poor quality peer evaluations are not useful as feedback, and may include abusive comments (2) the peer evaluation assessment rubric is simplistic, and (3) evaluating, and being evaluated by, non-English speakers is frustrating (Kolowich, 2012b). The diversity of students also calls into question the implementation of evaluation by peer. Is an English-speaking student who holds a PhD in the topic a peer to a non-English-speaking student aged 12? Does merely enrollment in the same MOOC define two students as peers?

MOUCs generally use or instructor-scored assessments and/or machine-scored multiple-choice questions. Students typically expect quick results from assessments and personalized instructor feedback on essay responses.

Instructors of MOUCs may also offer personalized feedback on assignments, such as papers or projects. MOUC students expect feedback from the instructor in some detail on major projects.

Instructor contact

Students in MOOCs are told to expect no contact with the professor. Students may send an email or post a question to the discussion forums and expect a response from a staff member. Given the large enrollment, MOOCs offer little accommodation to students who experience technical problems or transient network problems that interfere with their assessments, other than a sincere apology. Students in MOUCs expect quick responses to emails sent to the instructor, typically within 24 hours.

Regarding other contacts, MOUC students expect interactive help on technical problems (e.g. network or learning management systems issues) by telephone or online chat. MOOC students may receive an email response to a question, but interactive help-desk assistance is not offered.

DISCUSSION

MOOCs are different than Mainstream Online University Courses in several ways. MOOCs are easy to access and non-selective. MOUCs involve application and enrollment processes, prerequisite courses and qualifications, and the universities themselves are highly selective. MOOCs are free of tuition (or with inexpensive options). MOUCs cost thousands of dollars.

MOOCs rely on video to deliver content, with optional discussion forums. MOUCs rely on textbooks and often require participation online discussions. Both may use machine-scored assessments, but these are typically supplemented with peer evaluation in MOOCs and instructor evaluation and feedback in MOUCs. No instructor or help-desk contact is expected in a MOOC, but active and prompt attention from the instructor and technical support is the norm in MOUCs.

MOOCs have a lot going for them: easy access; free of tuition; good video production, excellent professor presentation, a peer learning community; and an adequate learning management system. MOOCs have their drawbacks as well:

1. Lack of instructor-student feedback and instructor interaction. The lack of interaction is a consequence of the large number of students, and is a significant limitation.

2. Reliance on machine-graded and peer-graded assessments. The use of machine-graded assessments is an essential factor to being able to offer free access to a large number of students, and evaluate their assessments. The use of peer-grading for essay-type assessments is also a response to the manpower constraint in grading, and yields high levels of dissatisfaction among students.

3. MOOCs fail to meet many student expectations. Even at a price of zero tuition, with appropriate disclaimers upfront, students will expect a level of normal service from their MOOC providers. Students will expect a resolution to a technical problem or a grading error. Students will expect answers to their questions. Students will expect allowances based on their excuses for problems submitting assessments. Students will expect accommodations for disabilities. At any non-zero tuition price these expectations will be amplified, and failure to meet expectations will result in student dissatisfaction.

4. Focus on low-level learning. Educators argue that the "pedestrian MOOCs, the simple podium lecture captured and released... do not in any way simulate a classroom experience, and constitute—at best—the efficient yet static delivery of course content. The delivery of course content is not the same as education" (Vaidyanathan, 2012). "MOOCs tend to be math-and-computation based, and vocational rather than exploratory, idea-based, or laboratory-based." These are criticisms of MOOCs relative to the face-to-face classroom, and apply when MOOCs are compared to MOUCs also.

MOOCs AND MOUCs IN COMPETITION

Do MOOCs compete with MOUCs? To a person interested in learning only (not academic credit), a MOOC would be a formidable, free, and potentially dominant choice alternative to a MOUC. However, most students enroll in a MOUC to earn academic credit to apply toward a university degree at the same institution. MOOCs are weak competitors to MOUCs in this regard, due to

the limited for-credit offerings and somewhat cumbersome process to earn and transfer credit.

Early experiments in earning credit for MOOCs include (1) completing an American Council of Educators (ACE-approved) exam for credit, (2) completing a MOOC at a school that both presents and accepts the course for credit (e.g. U of Washington), and (3) completing a MOOC at a school that accepts third-party MOOC courses for credit (e.g. Antioch College; San Jose State).

People have had free access to video of university professor lectures and course materials (from the Massachusetts Institute of Technology (MIT), for example) for some time. MIT's project evolved into the OpenCourseWare Consortium (OCW) in 2008, a community of over 250 universities and other organizations who share "free, open, high-quality education materials organized as courses. Collectively, OCW Consortium members have published materials from more than 13,000 courses in 20 languages (OpenCourseWare, 2013)." Course material from prestigious universities offered freely online is part of a larger movement of open courseware and open educational resources (Caudill, 2012).

What is the MOOC breakthrough that has created such excitement about the format? According to Friedman (2012), MOOCs are "the next step: building an interactive platform that will allow the best schools in the world to not only offer a wide range of free course lectures online, but also a system of testing, grading, student-to-student help and awarding certificates of completion of a course for under \$100." The value is in a prestigious university curating and presenting the content, and holding learners accountable for their progress and success.

In the "disruptive innovation" framework MOOCs should initially serve "those who couldn't otherwise assess traditional higher education" (Horn & Christensen, 2013). In this view it is not appropriate to compare a MOOC at present with a MOUC, which is a format that has been developed and improved by universities for years.

The appropriate competition for MOOCs is "nothing"—when people have no opportunity to access higher education at an elite university or to access a MOUC at any university. The good news for MOUCs is that MOOCs compete more directly with non-credit, inexpensive, self-study learning resources such as reading books, Internet research, or borrowing Great Courses video lectures from a library. Perhaps the "edutainment" value of MOOCs competes with watching other video, such television or recorded feature films.

The bad news for MOUCs is that MOOCs may not compete head-on with MOUCs initially, but "disruptive innovations improve over time to march upmarket. Eventually

the quality becomes just good enough for the established customers to flock to it" (Horn & Christensen, 2013). In other words, disruptive innovations like MOOCs eventually get "good enough" compared to MOUCs, and at a significantly lower price. Speculation about the net effect of nearly-free for-credit higher education on students and mainstream universities is beyond the scope of this paper.

This paper compared MOOCs with Mainstream Online University Courses, but in many ways MOOCs are more similar to large-enrollment face-to-face courses than online courses. Very large-enrollment (200+) courses at universities, for example (1) may rely on lecture to deliver course content, (2) may include discussion groups or labs led by staff or graduate assistants, (3) may use machine-graded assessments, and (4) may involve little interaction between the professor and students. By moving the lectures, assessments, and discussion groups online, one can essentially turn a large-enrollment course at a mainstream university into something similar to a MOOC, without the openness. MOOCs may be a substitute for large-enrollment face-to-face courses more so than for MOUCs.

Future research could examine the effectiveness of the MOOC format as a substitute for large-enrollment face-to-face courses. Research could look at options for universities to use the MOOC format to deliver instruction that fits with the MOOC strengths. Future research could examine the MOOC format's ability to address university challenges related to instructional efficiency, funding declines, remedial education, and variety in the curriculum, among others.

CONCLUSION

The MOOC industry is growing rapidly, fueled by students interested in free higher-education learning, and the universities and venture capitalists willing to fund the courses. MOOCs from Coursera in particular are known for easy and free access to online video lectures from prestigious universities.

MOOCs are already effective substitutes for learning that is not for academic credit. Several experiments are under way that may result in MOOCs contributing to for-credit courses or delivering them entirely. Accredited universities may enhance the growth of MOOCs by accepting their academic credit and applying it toward degrees. Universities may resist recognizing academic credits based on MOOCs and thereby slow their growth, or ultimately give rise to an alternative (to accredited degrees) credentialing system altogether.

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